
**Determination of particle size
distribution — Single particle light
interaction methods —**

**Part 1:
Light scattering aerosol spectrometer**

*Détermination de la distribution granulométrique — Méthodes
d'interaction lumineuse de particules uniques —*

Partie 1: Spectromètre d'aérosol en lumière dispersée



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21501-1 was prepared by Technical Committee ISO/TC 24, *Particle characterization including sieving*, Subcommittee SC 4, *Particle characterization*.

ISO 21501 consists of the following parts, under the general title *Determination of particle size distribution — Single particle light interaction methods*:

- *Part 1: Light scattering aerosol spectrometer*
- *Part 2: Light scattering liquid-borne particle counter*
- *Part 3: Light extinction liquid-borne particle counter*
- *Part 4: Light scattering airborne particle counter for clean spaces*

Introduction

Monitoring particle size distributions and particle number concentrations is required in various fields, e.g. in filter manufacturing, in the electronic industry, in the pharmaceutical industry, in the chemical industry, in the manufacture of precision machines and in medical operations. The aerosol spectrometer is a useful instrument for the determination of the size distribution and number concentration of particles suspended in a gas. The purpose of this part of ISO 21501 is to provide the calibration procedure and the validation method for aerosol spectrometers, so as to improve the accuracy of the measurement result by aerosol spectrometers in general, and to minimize the difference in the results measured by different instruments.

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Determination of particle size distribution — Single particle light interaction methods —

Part 1: Light scattering aerosol spectrometer

1 Scope

This part of ISO 21501 specifies characteristics of a light scattering aerosol spectrometer (LSAS) which is used for measuring the size, number concentration and number/size distribution of particles suspended in a gas. The light scattering technique described in this part of ISO 21501 is based upon single particle measurements. The size range of particles measured by this method is between approximately 0,06 μm to 45 μm in diameter.

Instruments that conform to this part of ISO 21501 are used for the determination of the particle size distribution and particle number concentration at relatively high concentrations of up to 10^{11} particles/ m^3 .

Application fields include:

- characterization of metered dose inhalers (MDI), dry powder inhalers (DPI) and nebulizers in pharmacy;
- production control of active agents;
- cut-off determination: impactors, cyclones and impingers;
- atmospheric aerosols: bio-aerosols, stables/composting facilities, nebulized droplets, measurements in street tunnels;
- fractional separation efficiency determination of filters.

For the above-mentioned applications, aerosol spectrometers should determine the particle size distribution, particle number concentration, size resolution and sizing accuracy as accurately as possible. These aerosol spectrometers are not suitable for the classification of clean rooms.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

particle

discrete element of the material regardless of size

[ISO 2395:1990]